

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

K. ITO, et al : Group Art Unit: 1796  
Application No. 10/580,795 : Examiner: Sonya N. WRIGHT  
Filed: June 16, 2008 :  
For: POLYROTAXANE AND PROCESS FOR PRODUCING THE SAME

DECLARATION UNDER 37 C.F.R. §1.132

Honorable Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Sir:

I, Kohzo ITO, do declare and state as follows:

I graduated from the Graduate School of Engineering,  
the University of Tokyo with a PhD in 1986;

I became a lecturer at the University of Tokyo in 1991,  
an Associate Professor in 1994 and a Professor at the University  
of Tokyo Graduate School of Frontier Sciences in 2003, and  
since 1991 I have been engaged in research and development  
in the field of supramolecular science, especially physics  
and chemistry of polyrotaxane and slide-ring materials thereof  
at the Graduate School of Frontier Science, The University  
of Tokyo;

I am the author of over 200 publications, including

original research papers, reviews, and chapters of books, and over 50 patents;

I received The Award of the Society of Polymer Science, Japan (2006) for my contribution in the field of polymer science;

I am a co-inventor of the subject matter disclosed and claimed in the above-identified application;

I am a member of the founders and the board of directors of ADVANCED SOFTMATERIALS INC. (hereinafter referred to as ASM), a spin out venture from the University of Tokyo, which was founded in 2005 and has now been collaborated with The University of Tokyo to promote the application of the slide-ring materials based on the polyrotaxane;

I am familiar with the Office Action of January 6, 2010, and understand the Examiner's rejections.

The following comments pertain to the claims as presented in the Amendment accompanying this Declaration.

<A. One Would Not Expect D2 to Work As Claimed>

The following sentence a) is described on item "Effects of the Invention" of the originally-filed specification:

a) "the present invention can provide a polyrotaxane including PEG with a wide variety of molecular weight and having a chemically stable linkage, and a method for producing the polyrotaxane."

As described in the Office Action of January 6, 2010,

D2 (de Nooy et al.) does disclose use of TEMPO. However, the use of TEMPO is just for the compounds each having small molecular weight, such as butanal, butanol, cyclohexanol, 3-methylcyclohexanol, methyl alpha (beta)-D-glucopyranoside or the like (see Table 1 of D2).

On the other hand, the present invention defines use of TEMPO for large molecular weight compound, i.e., PEG. In general, in a case where any agent uses for large molecular weight compound, the large molecular weight compound would be broken down, during the reaction between the agent and the large molecular weight compound. However, the present case can provide a polyrotaxane including PEG with a wide variety of molecular weight and having a chemically stable linkage. Thus, those skilled in the art would not use TEMPO for large molecular weight compound, since D2 (de Nooy et al.) just discloses use of TEMPO for small molecular weight compound, and thus, those skilled in the art would not try to combine D2 (de Nooy et al.) with D1 (Watanabe et al., Journal of Artificial Organs 3: 136-142, 2000).

Further, the following sentences b) and c) are described on item "Effects of the Invention" of the originally-filed specification:

b) "The present invention can provide a method for producing a polyrotaxane in a high yield and at a satisfactory cost without using a large excess of pseudopolyrotaxane and/or without using a large excess of

an activated reagent"; and

c) "the present invention can provide a polyrotaxane having desired capping groups and a method for producing the polyrotaxane that solve the problem of the related art, more specifically widen the choice of the capping groups".

On the other hand, D2 (de Nooy et al.) nor D1 (Watanabe et al.) does not disclose nor suggest the above-described effects b) and c) (and a)).

#### <B. Licensing of the Claimed Invention>

The present invention relates to a method for producing a polyrotaxane, which is a raw material for making a crosslinked polyrotaxane.

The present invention has been licensed to ASM, having a principal place of business at 3-1, Hongo 7-chome, Bunkyo-ku, Tokyo, 113-0033, Japan. Also, Japanese Patent 4461252, which is corresponding to the present application, has been licensed to ASM.

ASM has had a sub-license contract with a chemical company, and the company has been making a polyrotaxane by using the presently claimed invention. The company has already made 1,000 kg or more of the polyrotaxane by using the presently claimed invention.

Further, the use of the polyrotaxane obtained by the presently claimed invention can provide one crosslinked polyrotaxane, which is used for coating for the exterior of

mobile phones. The coating has been developed by ASM, together with NISSAN MOTOR CO., LTD., and the present applicant, The University of Tokyo.

Recently, the mobile phone, made by NEC CORPORATION, has been sold by NTT DOCOMO, INC. (See, Appendix 1: <http://www.asmi.jp/j/index.html> and an English translation of selected portion thereof; Appendix 2: <http://www.nttdocomo.co.jp/product/foma/style/n03b/> and an English translation of selected portion thereof; Appendix 3: <http://www.n-keitai.com/n-03b/index.html> and an English translation of selected portion thereof; and Appendix 4: <http://www.n-keitai.com/n-03b/coating.html> and an English translation of selected portion thereof.)).

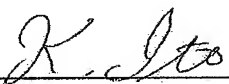
As can be seen from the Appendix 1 to 4, exterior of mobile phone, DOCOMO STYLE Series N-03B has coating named "SCRATCH SHIELD", and the coating was made from a crosslinked polyrotaxane, which is a product obtained by a raw material, polyrotaxane, which is obtained by the presently claimed invention. Furthermore, US2009/0281213 A1 (Inventors: Kohzo ITO et al.; Assignees: NISSAN MOTOR CO., LTD. and The University of Tokyo) discloses a hydrophobic modified polyrotaxane, which is a product obtained by a raw material, polyrotaxane, which is obtained by the presently claimed invention (see items "(1) Preparation of PEG-Carboxylic Acid by TEMPO Oxidation of PEG" in Examples 1 to 9 of US2009/0281213). And, US2009/0042034

A1 (Inventors: Kohzo ITO et al.; Assignees: NISSAN MOTOR CO., LTD. and The University of Tokyo) discloses a coating material comprising the hydrophobic modified polyrotaxane, which is a product obtained by a raw material, polyrotaxane, which is obtained by the presently claimed invention (see item "(1) Preparation of PEG-Carboxylic Acid by TEMPO Oxidation of PEG" in Example 1 of US2009/0042034).

Accordingly, the present invention can provide a raw material for coating the exterior of mobile phones that are presently sold.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

DATE: June 15, 2010

  
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Kohzo ITO